Pt. Ravishankar Shukla University
Raipur (C.G.), India 492010

Curriculum & Syllabus

Certificate Course in Econometrics and Mathematical Economics
(Semester System)

Session: 2025-26

Approved by:

Board of Studies	:	**Economics**
Date	:	**15-05-2025**
Name of Chairman	:	**Dr. B.L. Sonekar**
Name of Member's	:	Dr. Ravindra Bramhe
		Dr. Neelam Agrawal *(Online Present)*
		Dr. Archana Sethi
		Dr. Sanjay Sharma
		Dr. Sunil Kumeti
		Dr. Shashi Kiran Kujur *(Online Present)*
		Dr. Vineet Kumar Sahu *(Online Present)*
		Dr. Raj Kumar Nagwanshi *(Online Present)*
		Ku. Deepa Devi

Programme Structure

Duration: Six Months   **Max. Marks: 200**

Scheme of the Examination

Papers	Name of papers	Marks
First	(i) Fundamentals of Econometrics and Mathematical Economics.	80
	(ii) Internal Exam.	20
	Total	**100**
Second	Project work	**100**
	(i) Project report writing	50
	(ii) Project work presentation	30
	(iii) Project work viva-voce	20
	Total marks	**200**

Paper I
Fundamentals of Econometrics and Mathematical Economics
(Code: Eco/E and M-0204-22)

Course Outcomes: The objective of this course is to provide the basic knowledge of econometrics and mathematical economics that is essential equipment for any serious economist or social scientist. The course will enable the students to compete in competitive exam like NET-JRF, GATE-ECONOMICS and others. At the end of the course the students are expected:

1. To get basic knowledge about econometrics and mathematical economics
2. To acquire necessary skills to apply appropriate econometrics tools and methods in academia as well as industry.
3. Too familiar with the practical implications of the econometrics methods
4. To acquire skills to analyze the quantitative and qualitative data using the software.
5. To write a project report.

Syllabus

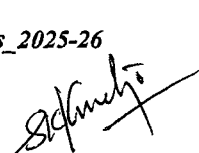| Unit- I	**Introduction**: Nature and scope of econometrics and Econometric Analysis, Steps involved in Econometric Analysis. **Introduction to Classical Linear Regression Model**: Two variable classical linear regression models, **Assumptions of Classical Linear Regression Model**: Multicollinearity, Heteroscedasticity and Autocorrelation
Unit- II	**Ordinary Least Square estimators**: Properties of Ordinary Least Square estimators, the Gauss Markov theorem, scaling and units of measurement; confidence intervals. **Regression analysis**: Objective, Statistical Analysis, and Interpretation of results, Hypothesis Testing-Types of Hypotheses, Test statistic, Critical Region.
Unit- III	**Hypothesis testing**: Level of significance and confidence interval approach; Goodness of Fit(R^2): Concepts of Explained Sum of Squares (ESS)-Residual Sum of Squares -Total Sum of Squares. **Multiple Linear Regression Model**: Interpretation of the model, Statistical Analysis, Interpretation of the results, Model misspecification: R^2 vs Adjusted R^2.
Unit- IV	**F Statistics**: Application of F Statistics-Overall significance of the model-Equality between two regression coefficients- Testing the validity of linear restricted and Unrestricted models. **Simultaneous equation model**: specification – identification – rank and order conditions – problems. **Introduction to Time Series Analysis**: Forecasting Time Series, Concept of stationery forecasting with ARIMA Modeling using software's.
Unit -V	**Preliminaries Logic and proof techniques**: sets and set operations; relations; functions and their properties; number systems, sequence, series. **Differentiable functions**: characterizations, properties with respect to various operations and applications; Second and higher order derivatives: properties and applications. Matrices, Vector spaces, Calculus and its Applications. Difference and Differential equations: Its application, Differentiation, Integration.

Paper II
Project-Report and Viva- Voce
(Code: Eco/E and M-0204-23)

The students are required to submit a Project Report. The project would enable them to learn the applications of the econometric techniques for preparing project reports. The project report should be 25-30 pages and consists of the statement of the problem, review of literature, theoretical and empirical methodology, sources and nature of data, econometric method and analysis, economic/statistical inferences, conclusions, and references.

Reference Books:

(1) Basic Econometrics, D. N. Gujarati.
(2) Introductory Econometrics: A Modern Approach, Wooldridge.
(3) Fundamentals of Mathematical Economics, S. C. Gupta & V. K. Kapoor.
(4) Mathematics for Economists, Mehta & Madnani.

Recommended Readings:

1. Goode & Hatt. **Methods in Social Research**, McGraw Hill, International Japan, 1983.

2. Young, P.V. **Scientific Social Survey and Research**, Prentice Hall of Indian, New Delhi, 1984.

3. Raja Raman, V. **Fundamental of Computer**, Prentice Hall of India, New Delhi, 1996.

4. Kenneth D. Bailey. **Methods of Social Research**, The free Press, London, 1982.

5. Piergiorgio, Corbetta. **Social Research: Theory, Methods & Techniques**, sage Publication, New Delhi, 2003.

6. Kothari, C.R. & Garg, G. **Research Methodology: Methods And Techniques (Fourth Edition)**, New Age International Publishers New Delhi, 2019.

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